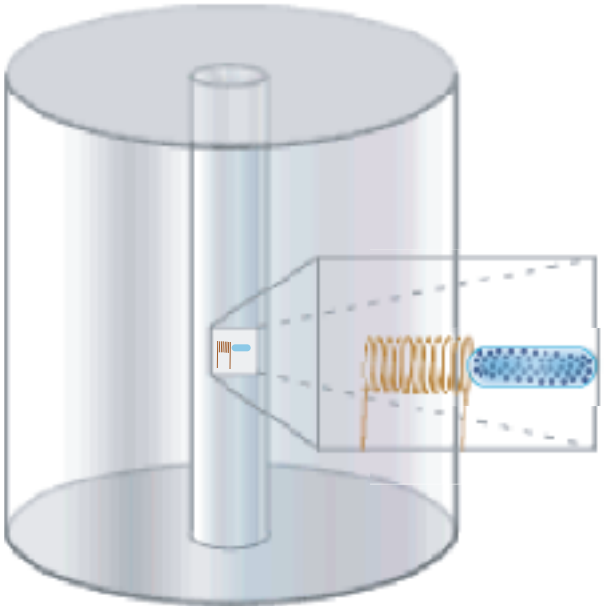
An Approach to High Resolution *Ex-Situ* NMR

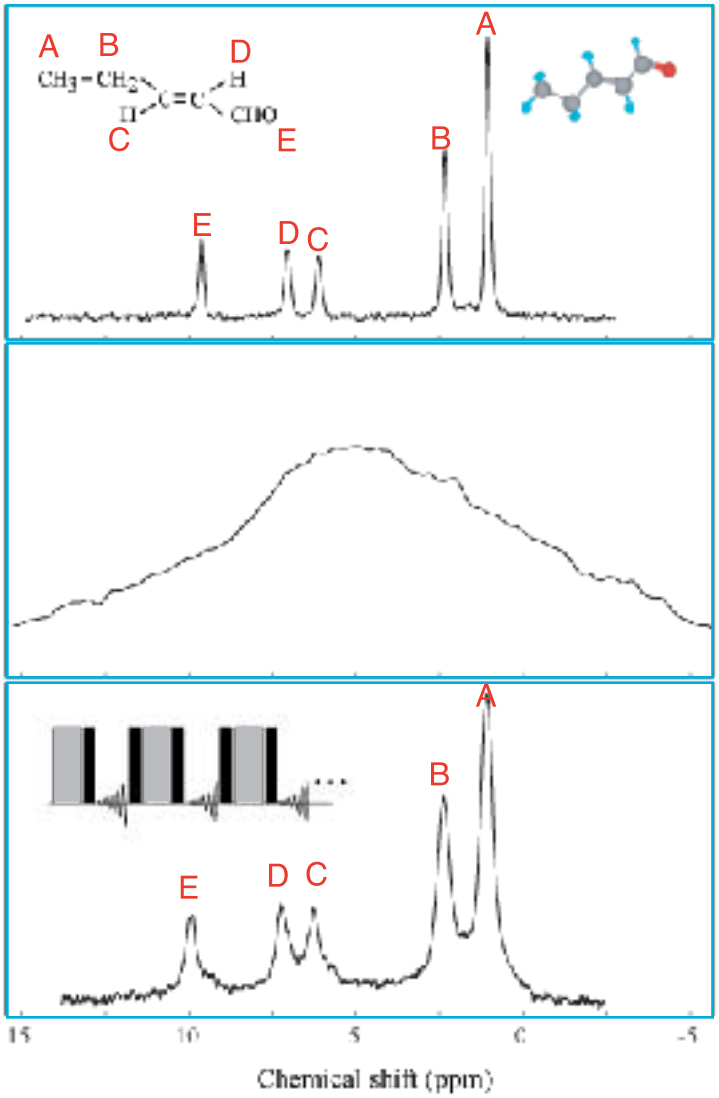


*In traditional NMR, the sample (blue) is placed in the uniform magnetic field inside the RF coil. **Ex-situ** conditions were simulated by placing the sample outside of this region.*

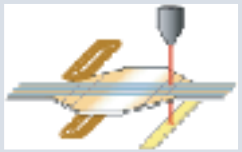
NMR spectrum of trans-2-pentenal under ordinary high resolution conditions. Peaks corresponding to the five non-equivalent hydrogen nuclei are observed.

Spectrum with sample placed in non-uniform field outside the rf coil; all chemical information is lost.

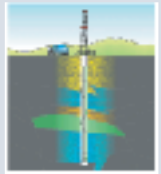
Specially designed rf pulse train (inset, rectangles) "refocuses" nuclei in nonuniform magnetic field; high resolution spectrum is recovered, from emitted signal (horns).



Potential Future Applications



Scanning micro-tip NMR analysis



***Ex-situ** NMR "in the field"*

***Ex-situ** MRI "in the doctor's office"*

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